Anodic Dissolution of Cu-Zn-Ni Alloy Scraps in Copper(II) sulphate solution

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In this work, the anodic dissolution properties of Cu-Zn-Ni alloy scraps in 45 g L⁻¹ CuSO₄ solutions have been analyzed. The analysis methods employed were potentiodynamic polarization techniques, electrochemical impedance spectroscopy and electron probe microscopic analysis. In a certain range, the anodic dissolution of the Cu-Zn-Ni alloy scraps in CuSO₄ solutions increased with the H₂SO₄ concentration and temperature. The overall dissolution of the Cu-Zn-Ni alloy scraps were found to be under anodic control; further, the anodic dissolution process was under diffusion control deduced from the activation energy of the anode dissolution process being 14.6 kJ mol⁻¹. After heat treating the alloy scraps, the Cu-Zn-Ni alloy scraps were found to be more susceptible to dissolution due to the increase of the size of the grains and the decrease of the particle size uniformity.

Keywords: Cu-Zn-Ni alloy scraps; CuSO₄ solutions; anode dissolution; heat treatment; resource recycling

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